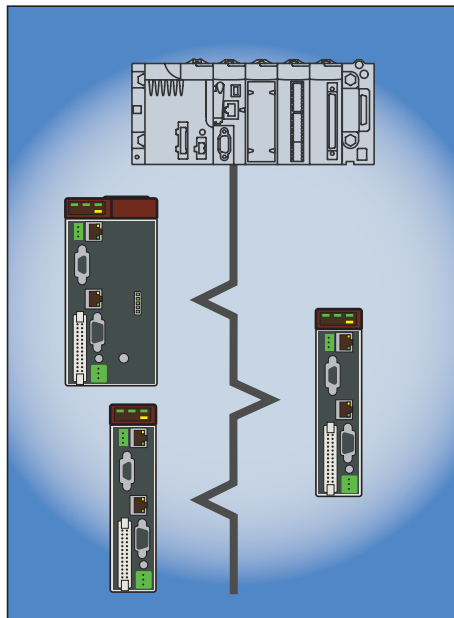


Lexium Controller

User's manual
Retain for future use

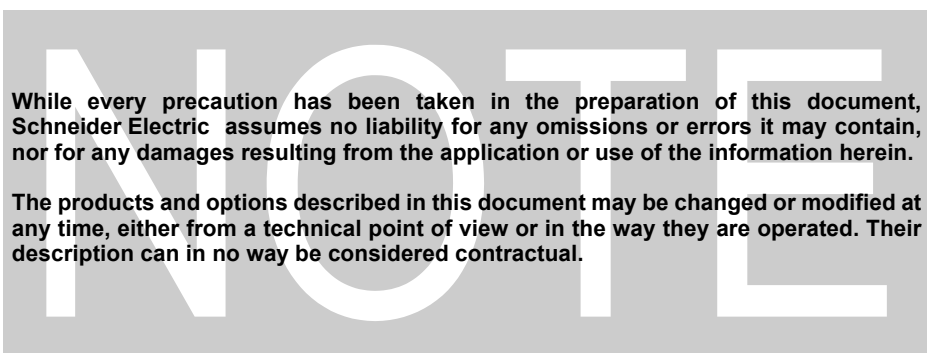
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Modbus



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Important information

PLEASE NOTE

Please read these instructions carefully and examine the equipment in order to familiarize yourself with the device before installing, operating or carrying out any maintenance work on it.

The following special messages that you will come across in this document or on the device are designed to warn you about potential risks or draw your attention to information that will clarify or simplify a procedure.



The addition of this symbol to a "Danger" or "Warning" safety label indicates the presence of an electrical hazard that will result in injury if the instructions are not followed.



This is a safety warning symbol. It warns you of potential risks of injury. You must comply with all safety messages that follow this symbol in order to avoid any risk of injury or death.

DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result in** death, serious injury or equipment damage.

WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result in** death, serious injury or equipment damage.

CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** injury or equipment damage.

PLEASE NOTE:

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.
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WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, must provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.¹
- Each implementation of a Lexium Motion Controller must be individually and thoroughly tested for proper operation before being placed into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

1. For additional information refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control"

Documentation structure

This manual is part of a series describing the Lexium Motion Controller (LMC). The following manuals may be downloaded at www.us.telemecanique.com

Installation Manual

This manual describes:

- How to install the controller
- How to connect the controller

Optional Graphic Display Terminal User's Manual

This manual describes:

- How to install the graphic display terminal
- How to connect the graphic display terminal
- How to program the controller via the graphic display terminal

EasyMotion - Programming Manual (Not available in the USA)

Supplied preinstalled in the Lexium Controller, the application model associated with Easy Motion mode is a user-friendly tool that can be used for:

- Rapid axis configuration
- Use of Manual/Automatic mode
- Creating positioning tasks
- Editing cam profiles
- Backup and recovery of the machine parameters
- Diagnostics of the motion controller and the various axes

This programming manual also contains a table of the parameters that can be accessed via the communication protocols.

MotionPro - Programming Manual

The Motion Pro Programming Manual is included in the software online help.

This online help describes:

- The software interface
- IEC 1131 programming
- The function libraries (standard functions, motion control functions, application functions)
- The Lexium controller configuration screens

Modbus, Ethernet, PROFIBUS DP, and DeviceNet manuals

These manuals describe:

- Connection to the bus or network
- Diagnostics
- Software setup
- The protocol communication services

Introduction

Presentation

The integrated communication port provides direct access to the Modbus protocol:

- The Modbus HMI RJ45 port, located on the front panel of the Lexium Controller is used to connect:
 - The graphic display terminal
 - A Magelis industrial HMI terminal
 - A programmable controller (PLC)
 - Another controller
 - The Motion Pro/CoDeSys software workshop

The Modbus port on the Lexium Controller can be used for the following functions:

- Configuration
- Adjustment
- Control
- Monitoring

The Lexium Controller supports:

- The 2-wire RS485 physical layer
- RTU transmission mode

This manual describes how to set up the Lexium Controller on Modbus and the available Modbus services.

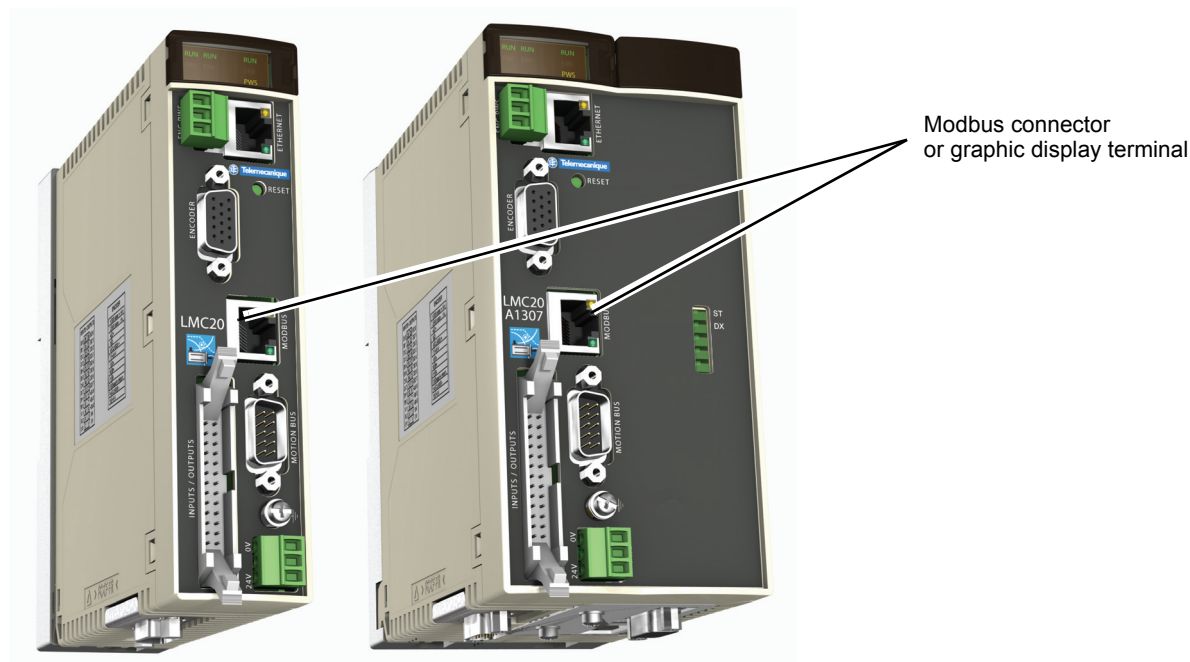
The slave address is configured using Motion Pro/CoDeSys

The Modbus network speed is 38.4 kbps.

It can be configured for 19.2, but this configuration limits use with Motion Pro/CoDeSys via the serial link.

LMC10/LMC20

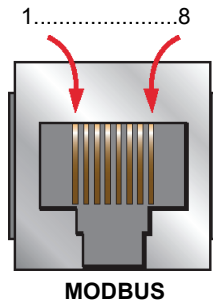
LMC20A****



Connection to the bus

Connecting the Modbus RJ45 connector or graphic display terminal

Connector on Lexium Controller



Terminal	Description
1	not connected
2	not connected
3	not connected
4	B signal (RS485) = V1 signal (Modbus)
5	A signal (RS485) = V0 signal (Modbus)
6	not connected
7	Modbus VP signal 12 V DC power supply provided by the Motion Controller (only for the power supply of an RS485/RS232 converter or a graphic display terminal)
8	Modbus common signal 0V

Note: Do not use terminals marked "not connected".

Connecting to the Lexium Controller

Connection accessories must be ordered separately (please refer to the catalogs).
Connect the RJ45 cable to the "MODBUS" port on the Lexium Controller

Wiring recommendations

- Use the Telemecanique cable with 2 pairs of shielded twisted conductors (references: TSXCSA100, TSXCSA200 or TSXCSA500).
- The Modbus cable must be at least 30 cm away from the power cables.
- If it is necessary to cross the Modbus cables and the power cables, be sure they cross at right angles.
- As far as possible, connect the shielded cable to a protective ground, for example to the ground of each device if this ground is connected to the protective ground.
- Install a line terminator at each end of the line.
- Check the polarity of the line.
- Connect the common ("common" signal) to the protective ground at one or more points on the bus.

For more information, refer to the "Electromagnetic compatibility of industrial networks and fieldbuses" manual.

Cable routing practices

When wiring Lexium Controller to a Modbus network, follow all wiring practices required by national and local electrical codes. Also observe the following guidelines:

- Avoid areas of high temperature, moisture, vibration, or other mechanical stress.
- Secure the cable where necessary to prevent its weight and the weight of other cables from pulling or twisting the cable.
- Use cable ducts, raceways, or other structures to protect the cable. Use these structures for signal wiring paths. They must not contain power wiring.
- Avoid sources of electrical interference that can induce noise into the cable. Use the maximum practicable separation from such sources.

When planning cable routing within a building, follow these guidelines:

- Maintain a minimum separation of 1 m (3.28 ft) from sources of electromagnetic interference, such as:
 - air conditioners and large blowers,
 - elevators and escalators,
 - radios and televisions,
 - intercom and security systems,
 - fluorescent, incandescent, and neon lighting fixtures.
- Maintain a minimum separation of 3 m (9.84 ft) from stronger electromagnetic interference generating equipment, such as:
 - line and motor power wiring,
 - transformers,
 - generators,
 - alternators.

Connection to the bus

When wiring in electrical equipment rooms or large electrical equipment line-ups, observe the following guidelines for cable segregation and separation of circuits:

- Use metallic conduit for Lexium Controller wiring. Do not run control network and power wiring in the same conduit.
- Separate non-metallic conduits or cable trays used to carry power wiring from metallic conduit carrying low-level control network wiring by at least 300 mm (11.8 in).
- Separate metallic conduits carrying power wiring or low-level control network wiring by at least 80 mm (3.15 in).
- Cross the metallic conduits and non-metallic conduits at right angles whenever power and control network wiring cross.
- Attenuate conducted emissions from the Lexium Controller to the line in some installations to prevent interference with telecommunication, radio, and sensitive electronic equipment. Such instances may require attenuating filters. Consult the Lexium Controller catalog for selection and application of these filters.

RS485 standard

The RS485 standard allows variants of different characteristics:

- Polarity
- Line termination
- Distribution of a reference potential
- Number of slaves
- Length of bus

The new Modbus specifications, published on www.modbus.org in 2002 gives precise details of all these characteristics. They are also summarized in the next section (standard schematic). The new Telemecanique devices comply with these specifications.

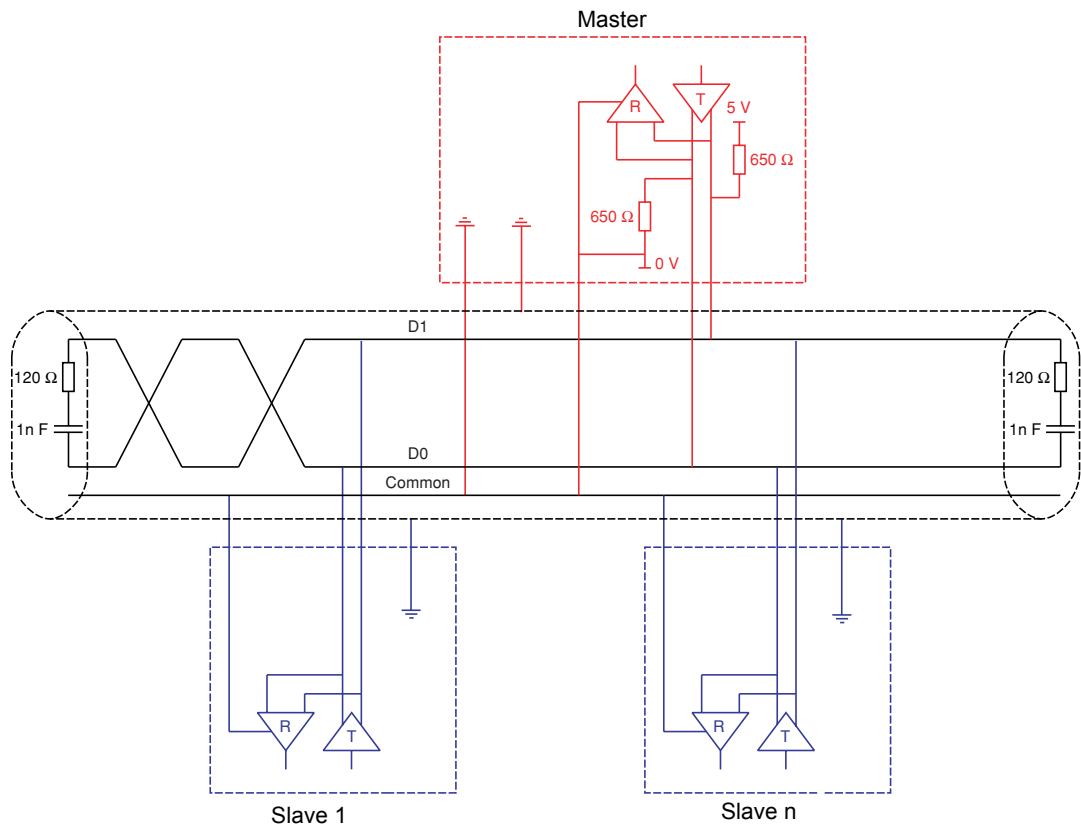
Connection to the bus

Modbus standard schematic

The standard schematic corresponds to the Modbus specification published in 2002 on www.modbus.org (Modbus_over_serial_line_V1.pdf, Nov 2002) and, in particular, to the 2-wire multipoint serial bus schematic.

The Lexium Controller conforms to this specification.

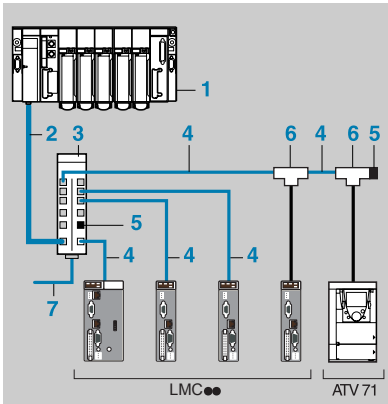
Schematic diagram:



Type of trunk cable	Shielded cable with 1 twisted pair and at least a 3rd conductor
Maximum length of bus	1000 m at 19200 bps with the Telemecanique TSX CSA* cable
Maximum number of stations (without repeater)	32 stations, i.e., 31 slaves
Maximum length of tap links	<ul style="list-style-type: none">• 20 m (65.62 ft) for one tap link• 40 m (131.23 ft) divided by the number of tap links on a multiple junction box
Bus polarization	<ul style="list-style-type: none">• One 450 to 650 Ω pull-up resistor to the 5 V (650 Ω or thereabouts recommended)• One 450 to 650 Ω pull-down resistor to the Common (650 Ω or thereabouts recommended) <p>This polarization is recommended for the master.</p>
Line termination	One 120 Ω 0.25 W resistor in series with a 1 nF 10 V capacitor
Common polarity	Yes (Common), connected to the protective ground at one or more points on the bus

Connection to the bus

Connecting via RJ45 wiring system



- 1 - Master (PLC, PC or communication module)
- 2 - Modbus cable depending on the type of master (see table page 11)
- 3 - Modbus splitter box **LU9 GC3**
- 4 - Modbus drop cables **VW3 A8 306 R****
- 5 - Line terminators **VW3 A8 306 RC**
- 6 - T-junction boxes **VW3 A8 306 TF**** (with cable)
- 7 - Modbus cable (to another splitter box) **TSX CSA*00**

Connection accessories

Description		No.	Reference
Modbus splitter box	10 RJ45 connectors and 1 screw terminal	3	LU9 GC3
Modbus T-junction boxes	With integrated cable (0.3 m)	6	VW3 A8 306 TF03
	With integrated cable (1 m)	6	VW3 A8 306 TF10
Line terminators	For RJ45 connector R = 150 Ω	5	VW3 A8 306 R

Connection cables

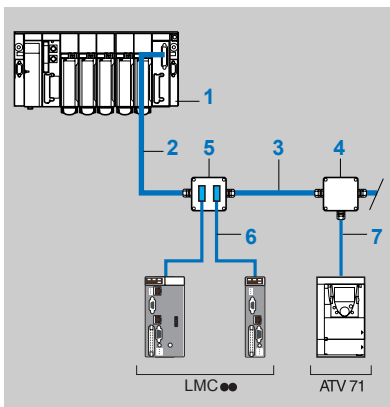
Description	Length (m)	Connectors	No.	Reference
Cables for Modbus bus	3	1 RJ45 connector and 1 stripped end		VW3 A8 306 D30
	0.3	2 RJ45 connectors	4	VW3 A8 306 R03
	1	2 RJ45 connectors	4	VW3 A8 306 R10
	3	2 RJ45 connectors	4	VW3 A8 306 R30
RS 485 double shielded twisted pair cables	100	Supplied without connector	7	TSX CSA 100
	200	Supplied without connector	7	TSX CSA 200
	500	Supplied without connector	7	TSX CSA 500

Connection to the bus

Type of master	Master interface	Modbus connection accessories for RJ45 wiring system	
		Description	Reference
Twido PLC	Adaptor or mini-DIN RS485 interface module	3 m cable equipped with a mini-DIN connector and an RJ45 connector	TWD XCA RJ030
	Adaptor or screw terminal RS485 interface module	3 m cable equipped with an RJ45 connector and stripped at the other end	VW3 A8 306 D30
TSX Micro PLC	Mini-DIN RS485 connector port	3 m cable equipped with a mini-DIN connector and an RJ45 connector	TWD XCA RJ030
	PCMCIA card (TSX SCP114)	Stripped cable	TSX SCP CM 4030
TSX Premium PLC	TSX SCY 11601 or TSX SCY 21601 module (25-way SUB-D socket)	Cable equipped with a 25-way SUB-D connector and stripped at the other end (for connection to the screw terminals of the LU9GC3 splitter box)	TSX SCY CM 6030
	PCMCIA card (TSX SCP114)	Stripped cable	TSX SCP CM 4030
Ethernet bridge (174 CEV 300 10)	Screw terminal RS485	3 m cable equipped with an RJ45 connector and stripped at the other end	VW3 A8 306 D30
PROFIBUS DP gateway (LA9P307)	RJ45 RS485	1 m cable equipped with 2 RJ45 connectors	VW3 P07 306 R10
Fipio (LUFP1) or PROFIBUS DP (LUFP7) or DeviceNet (LUFP9) gateway	RJ45 RS485	0.3 m cable equipped with 2 RJ45 connectors or 1 m cable equipped with 2 RJ45 connectors or 3 m cable equipped with 2 RJ45 connectors	VW3 A8 306 R03 or VW3 A8 306 R10 or VW3 A8 306 R30
PC with serial port	PC with male 9-way SUB-D RS232 serial port	RS232/RS485 converter and 3 m cable equipped with an RJ45 connector and stripped at the other end (for connection to the screw terminals of the LU9GC3 splitter box)	TSX SCA 72 and VW3 A8 306 D30

Connection to the bus

Connecting via junction boxes



- 1 - Master (PLC, PC or communication module)
- 2 - Modbus cable depending on the type of master (see table page 13)
- 3 - Modbus cable **TSX CSA*00**
- 4 - Junction box **TSX SCA 50**
- 5 - Subscriber socket **TSX SCA 62**
- 6 - Modbus drop cable **VW3 A8 306**
- 7 - Modbus drop cable **VW3 A8 306 D30**

Connection accessories

Description	No.	Reference
Junction box 3 screw terminals and an RC line terminator, to be connected using cable VW3 A8 306 D30	4	TSX SCA 50
Subscriber socket 2 female 15-way SUB-D connectors, 2 screw terminals, and an RC line terminator, to be connected using cable VW3 A8 306 or VW3 A8 306 D30	5	TSX SCA 62

Connection cables

Description	Length (m)	Connectors	No.	Reference
Cables for Modbus bus	3	1 RJ45 connector and one stripped end	7	VW3 A8 306 D30
	3	1 RJ45 connector and 1 male 15-way SUB-D connector for TSX SCA 62	6	VW3 A8 306
RS 485 double shielded twisted pair cables	100	Supplied without connector	3	TSX CSA 100
	200	Supplied without connector	3	TSX CSA 200
	500	Supplied without connector	3	TSX CSA 500

Connection to the bus

Type of master	Master interface	Modbus connection accessories for junction boxes using screw terminals	
		Description	Reference
Twido PLC	Adaptor or screw terminal RS485 interface module	Modbus cable	TSX CSA100 or TSX CSA200 or TSX CSA500
TSX Micro PLC	Mini-DIN RS485 connector port	Junction box	TSX P ACC 01
	PCMCIA card (TSX SCP114)	Cable equipped with a special connector and stripped at the other end	TSX SCP CU 4030
TSX Premium PLC	TSX SCY 11601 or TSX SCY 21601 module (25-way SUB-D socket)	Cable equipped with a 25-way SUB-D connector and stripped at the other end	TSX SCY CM 6030
	PCMCIA card (TSX SCP114)	Cable equipped with a special connector and stripped at the other end	TSX SCP CU 4030
Ethernet bridge (174 CEV 300 10)	Screw terminal RS485	Modbus cable	TSX CSA100 or TSX CSA200 or TSX CSA500
PROFIBUS DP gateway (LA9P307)	RJ45 RS485	3 m cable equipped with an RJ45 connector and stripped at the other end	VW3 A8 306 D30
Fipio (LUFP1) or PROFIBUS DP (LUFP7) or DeviceNet (LUPF9) gateway	RJ45 RS485	3 m cable equipped with an RJ45 connector and stripped at the other end	VW3 A8 306 D30
PC with serial port	PC with male 9-way SUB-D RS232 serial port	RS232/RS485 converter and Modbus cable	TSX SCA 72 and TSX CSA100 or TSX CSA200 or TSX CSA500

Type of master	Master interface	Modbus connection accessories for junction boxes using SUB-D 15	
		Description	Reference
Twido PLC	Adaptor or screw terminal RS485 interface module	-	-
TSX Micro PLC	Mini-DIN RS485 connector port	-	-
	PCMCIA card (TSX SCP114)	Cable equipped with a special connector and a SUB-D 25 connector	TSX SCY CU 4530
TSX Premium PLC	TSX SCY 11601 or TSX SCY 21601 module (SUB-D 25 socket)	Cable equipped with a 25-way SUB-D connector and stripped at the other end	TSX SCP CU 4530
	PCMCIA card (TSX SCP114)	Cable equipped with a special connector and stripped at the other end	TSX SCY CU 4530
Ethernet bridge (174 CEV 300 10)	Screw terminal RS485	-	-
PROFIBUS DP gateway (LA9P307)	RJ45 RS485	-	-
Fipio gateway (LUFP1) or PROFIBUS DP gateway (LUFP7)	RJ45 RS485	3 m cable equipped with an RJ45 connector and a SUB-D 25 connector	VW3 A8 306
PC with serial port	PC with male 9-way SUB-D RS232 serial port	-	-

Connection to the bus

Connecting on screw terminals

Connection accessories

Description			Reference
Line terminators	For screw terminals	$R = 150\ \Omega$	VW3 A8 306 DR

Connection cables

Description	Length (m)	Connectors	Reference
Cables for Modbus bus	3	1 RJ45 connector and one stripped end	VW3 A8 306 D30
RS 485 double shielded twisted pair cables	100	Supplied without connector	TSX CSA 100
	200	Supplied without connector	TSX CSA 200
	500	Supplied without connector	TSX CSA 500

Configuration

Configuring the Modbus network

The parameters of the Modbus network can be configured via the **graphic display terminal** or using the **Motion Pro/CoDeSys** software.

Configuration via the graphic display terminal

The parameters [\[Modbus address\]](#) and [\[Modbus baudrate\]](#) are available in the sub-menu [\[LC CONFIGURATION\]](#).

Modbus parameter	Description/Possible values	Terminal display	Default value
[Modbus address]	1 to 247 0 = Lexium Controller Modbus server disabled	[1] to [247] [0]	[0]
[Modbus baudrate]	Baudrate of Modbus communication	[9600] , [19200] , [38400]	[38400]

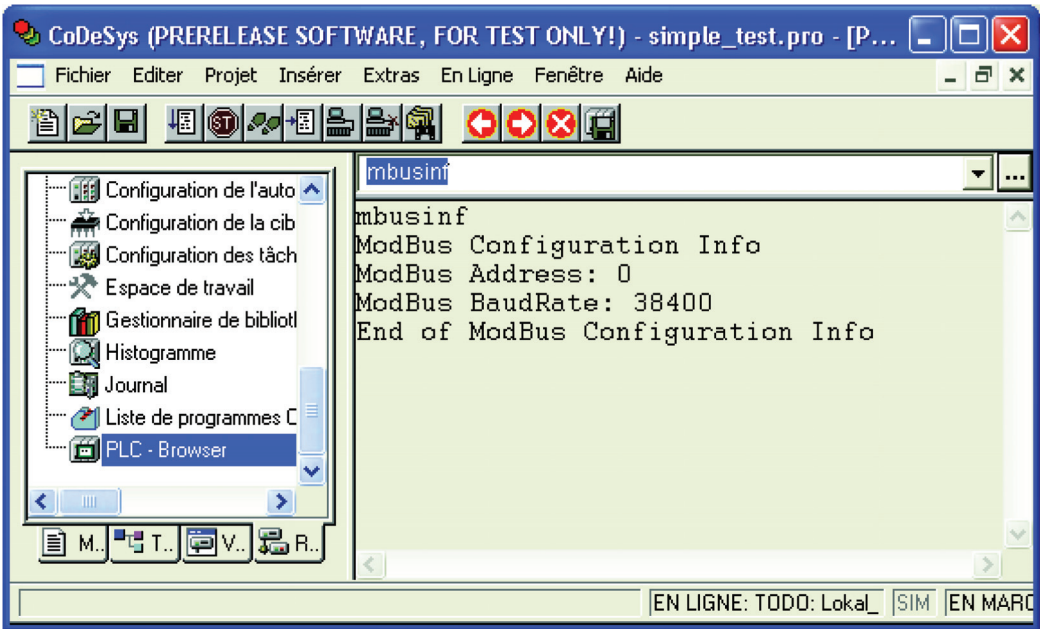
NOTE:

The graphic display terminal will only operate at 38400 bps and the value 8-N-1 (8 bits sent - no parity - 1 stop bit). Any other value will make communication with the graphic display terminal impossible.

Configuration using the Motion Pro/CoDeSys software

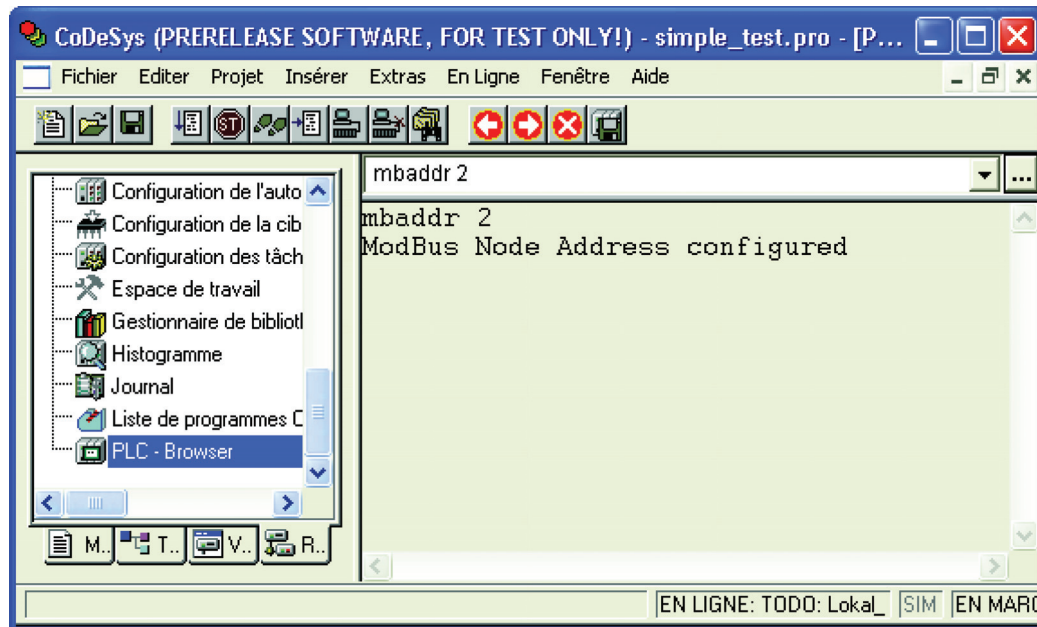
The configuration can be read via the PLC-Browser key word.

The key word for ascertaining the address and speed of the Modbus network is **mbusinf**.



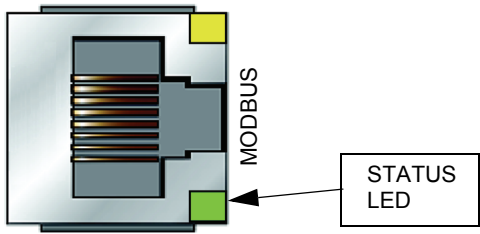
Configuration

The key word for configuration of the Modbus network address is, for example with address 2: **mbaddr 2**



Modbus LEDs

The Modbus LEDs are located on the RJ45 port, on the front panel of the Lexium Controller. They indicate the Modbus communication status.



Each LED lights up for 200 ms when a frame is being transmitted on the corresponding Modbus network, whether or not this is destined for the Lexium Controller.

Communication management and communication interruptions

If there is no Modbus communication, the LEDs on the graphic display terminal are off.
There is no specific Modbus communication interruption LED.

- Following initialization (power-up), the Lexium Controller checks that frames are being sent on the Modbus network. These frames can be sent from a Modbus PLC or an HMI, and also from a PC on which the Motion Pro/CoDeSys software is running.

If the cable is disconnected from the Modbus master, then reconnected in order to communicate using the Motion Pro/CoDeSys software, the Lexium Controller automatically detects the Motion Pro/CoDeSys frame format with no action required from the user.

It is possible to reconnect to the Modbus Master again with no action required from the user.

- Thus, when a Modbus communication interruption occurs, the Lexium Controller does not react. The communication interruption must be managed by the Modbus Master, from a PLC, a PC, an industrial terminal (Magelis), or a SCADA monitoring the Lexium Controller.

Modbus protocol

RTU mode

RTU transmission mode is used. The frame contains no message header byte and no end of message byte. It is defined as follows:



The data is transmitted in binary code.

CRC16: Cyclic redundancy check parameter.

The end of the frame is detected on a silence greater than or equal to 3.5 characters.

Principle

The Modbus protocol is a master-slave protocol.

Only one device can transmit on the line at any one time.

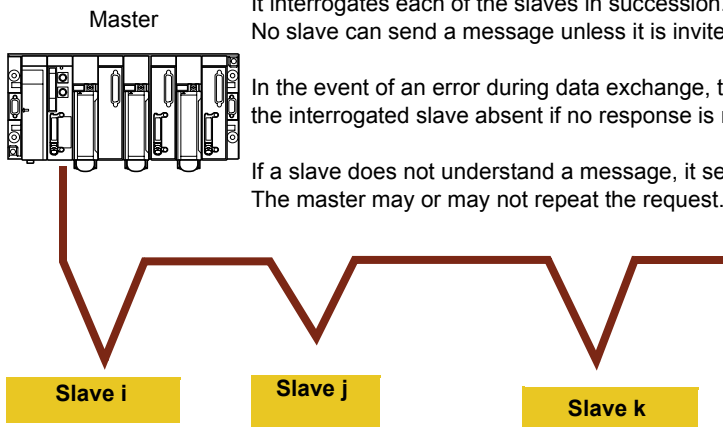
The master manages the exchanges and only it can take the initiative.

It interrogates each of the slaves in succession.

No slave can send a message unless it is invited to do so.

In the event of an error during data exchange, the master repeats the question and declares the interrogated slave absent if no response is received within a given time period.

If a slave does not understand a message, it sends an exception response to the master. The master may or may not repeat the request.



Direct slave to slave communication is not possible.

For slave to slave communication, the master application software must be designed accordingly: to interrogate a slave and send back the data received to the other slave.

Two types of dialog are possible between master and slaves:

- The master sends a request to a slave and waits for it to respond.
- The master sends a request to all slaves without waiting for them to respond (broadcasting principle).

Addresses

- The Modbus addresses of the Lexium Controller can be configured from 1 to 247.
- Address 0 coded in a request sent by the master is reserved for broadcasting. The Lexium Controller takes account of the request but does not respond to it.
- The Lexium Controller has a Modbus server that has its own address:
 - A Modbus server to enable the Lexium Controller to access all the parameters available in the Modbus table.
 - The list of these parameters and variables (%MW...) used by the Motion Pro/CoDeSys software can be found in the document:

Modbus protocol

Modbus functions

The following table indicates which Modbus functions are managed by the Lexium Controller and specifies their limits. The "read" and "write" functions are defined from the point of view of the master.

Code	Modbus name	Function name	Broadcasting	Max. value of N
3 = 16#03	Read Holding Registers	Read N output words	NO	121 words max.
6 = 16#06	Write Single Register	Write one output word	YES	–
8 = 16#08	Diagnostics	Diagnostics	NO	
16 = 16#10	Write Multiple Registers	Write N output words	YES	121 words max.
43 = 16#2B	Read Device Identification	Identification	NO	–

Read N output words: function 3

Note: Hi = most significant bits, Lo = least significant bits.

This function can be used to read the Lexium Controller parameters, regardless of their type.

Maximum size of the number of variables that can be read in one frame: **121**

Request

Slave no.	03	No. of first word	Number of words	CRC16
		Hi Lo	Hi Lo	Lo Hi
1 byte	1 byte	2 bytes	2 bytes	2 bytes

Response

Slave no.	03	Number of bytes read	First word value	-----	Last word value	CRC16
			Hi Lo		Hi Lo	Lo Hi
1 byte	1 byte	1 byte	2 bytes		2 bytes	2 bytes

Example 1: Using function 3 to read the 4 words %mW3102 (W3102) to %mW3105 (W3105) (16#0C1E to 16#0C21) in slave 2, where:

- %mw3102 V (W3102 = 16#0028)
- %mw3102 V (W3103 = 16#0258)
- %mw3104 V (W3104 = 16#01F4)
- %mw3105 V (W3105 = 16#0000)

Request

02	03	0C1E	0004	276C
----	----	------	------	------

Response

02	03	08	0028	0258	01F4	0000	52B0
Value of:			W3 102	W3 103	W3 104	W3 105	

Modbus protocol

Write one output word: function 6

Request and response (the frame format is identical)

Slave no.	06	Word number		Value of word		CRC16	
		Hi	Lo	Hi	Lo	Lo	Hi
1 byte	1 byte	2 bytes		2 bytes		2 bytes	

Example: Writing value 16#000D to word %mw9001 (W9001) (16#2329) in slave 2 (value = 13).

Request and response:

02	06	2329	000D	9270
----	----	------	------	------

Diagnostics: function 8

Subcode 16#00: echo

This function asks the slave being interrogated to echo (return) the message sent by the master in its entirety.

Request and response:

Slave no.	08	Sub-code		Data		CRC16	
		Hi	Lo	Hi	Lo	Lo	Hi
1 byte	1 byte	2 bytes		N bytes		2 bytes	

Sub-code	Request data	Response data	Function executed
00	XX YY	XX YY	Echo

Example: Values 16#31 and 16#32 echoed by slave 4

Request and response (if function successful)

Slave no.	Request code <i>or</i> Response code	Sub-code		Value of 1st byte	Value of 2nd byte	CRC16	
		Hi	Lo			Lo	Hi
04	08	00	00	31	32	74	1B

(hexadecimal values)

Modbus protocol

Write N output words: function 16 (16#10)

This function can be used to write the Lexium Controller parameters or variables, regardless of their type. The maximum size of the number of variables that can be read in one frame is **121**.

Request

Slave no.	10	No. of first word		Number of words		Number of bytes	Value of first word		CRC16	
		Hi	Lo	Hi	Lo		Hi	Lo	Lo	Hi
1 byte	1 byte	2 bytes		2 bytes		1 byte	2 bytes		2 bytes	

Response

Slave no.	10	No. of first word		Number of words		CRC16	
		Hi	Lo	Hi	Lo	Lo	Hi
1 byte	1 byte	2 bytes		2 bytes		2 bytes	

Example: Writing values 20 and 30 to words W9001 and W9002 in slave 2 (W9001 to 20 and W9002 to 30)

Request

Slave no.	Request code	No. of first word		Number of words		Number of bytes	Value of first word		Value of second word		CRC16	
		Hi	Lo	Hi	Lo		Hi	Lo	Hi	Lo	Lo	Hi
02	10	23	29	00	02	04	00	14	00	1E	73	A4

Response

Slave no.	Response code	No. of first word		Number of words		CRC16	
		Hi	Lo	Hi	Lo	Lo	Hi
02	10	23	29	00	02	9B	B7

(hexadecimal values)

Modbus protocol

Identification: function 43 (16#2B)

Request

Slave no.	2B	Type of MEI 0E	ReadDeviceId 01	Object Id 00	CRC16	
					Lo	Hi
1 byte	1 byte	1 byte	1 byte	1 byte	2 bytes	

Response

Slave no.	2B	Type of MEI 0E	ReadDeviceId 01	Degree of conformity 02	-----	
1 byte	1 byte	1 byte	1 byte	1 byte		
-----		Number of additional frames 00		Next object Id 00	Number of objects 04	-----
		1 byte		1 byte	1 byte	
-----		Id of object no. 1 00		Length of object no. 1 0D	Value of object no. 1 "Telemecanique"	-----
		1 byte		1 byte	13 bytes	
-----		Id of object no. 2 01		Length of object no. 2 0B	Value of object no. 2 "LMC20"	-----
		1 byte		1 byte	11 bytes	
-----		Id of object no. 3 02		Length of object no. 3 04	Value of object no. 3 "0201"	-----
		1 byte		1 byte	4 bytes	
-----		CRC16				
		Lo		Hi		
		1 byte		1 byte		

The total response size given in this example equals 55 bytes

The response contains the following three objects:

- Object no. 1: Manufacturer name (always "Telemecanique", i.e., 13 bytes).
- Object no. 2: Device reference (ASCII string; for example: "LMC20", i.e., 11 bytes).
The length of this object varies according to device type. Use the "Length of object no. 2" field to determine the length.
- Object no. 3: Device version, in "MMmm" format where "MM" represents the determinant and "mm" the subdeterminant (4-byte ASCII string; *for example*: "0201" for version 2.1).

Negative response specifically related to the Identification function:

Slave no.	2B + 80 AB	Type of MEI 0E	Error code 00 to 02	CRC16	
				Lo	Hi
1 byte	1 byte	1 byte	1 byte	1 byte	1 byte

Error code: 16#00 = No error
16#01 = The question code (16#2B), the Type of MEI (16#0E) or the ReadDeviceId (16#01) contained in the question is incorrect.
16#02 = The Object Id (16#00) contained in the question is incorrect.

Exception responses

An exception response is returned by a slave when it is unable to perform the request addressed to it.

Format of an exception response:

Slave no.	Response code	Error code	CRC16	
			Lo	Hi
1 byte	1 byte	1 byte	2 bytes	

Response code: function code of the request + 16#80 (the most significant bit is set to 1).

Error code:

- 1 = The requested function is not recognized by the slave
- 2 = The word addresses indicated in the request do not exist in the slave
- 3 = The word values indicated in the request are not permissible in the slave
- 4 = The slave has started to execute the request but cannot continue to process it completely

Read non-existent or protected parameters

When a set of parameters is read or when a non-existent or protected parameter is written by a Modbus function, the Lexium Controller sends an exception response.

The list of parameters or variables that can be accessed by Modbus is as follows:

- From 0 to 59999, all the parameters are available.
- A large number of the parameters from 60000 upwards are not available and are used for Ethernet connectivity and functions.
- After the Ethernet parameters, the zone does not exist.
For a list of the available Ethernet parameters, refer to the Ethernet manual.

